Patent claims

1. An optical sensing head for reading out an optical data memory, having
- a substrate (12) with a main surface,
- an edge-emitting laser component (30) which is arranged on the main surface of the substrate (12) and whose irradiation axis (34) is oriented essentially parallel to the first main plane,
- a deflection device (36) which is arranged on the main surface of the substrate and has the purpose of deflecting the laser radiation (32) in a direction which is essentially perpendicular to the main surface,
- at least one signal detector (20, 22; 62) for sensing the laser radiation which is reflected by the optical data memory, and
- an optical element (40) which guides the deflected laser radiation to the optical data memory and guides reflected laser radiation to the at least one signal detector (20, 22), the optical element (40) being connected to the substrate (12) via at least one supporting element (36, 38).

2. The optical sensing head as claimed in claim 1, characterized in that the deflection device (36) is simultaneously embodied as a supporting element via which the optical element (40) is connected to the substrate (12).

3. The optical sensing head as claimed in claim 1 or 2, characterized in that an irradiation-direction signal detector (20; 62) is arranged on the main surface of the substrate (12) on the irradiation axis (34) of the laser component (30) and downstream of the deflection device (36) in the irradiation direction (32).

4. The optical sensing head as claimed in one of the preceding claims, characterized in that an opposite-direction signal detector (22) is arranged on the main surface of the substrate (12) on the irradiation axis (34) of the laser component (30) and in the opposite direction to the irradiation direction (32).

5. The optical sensing head as claimed in claim 4, characterized in that a supporting element (38) via which the optical element (40) is connected to the substrate (12) is arranged between the laser component (30) and the opposite-direction signal detector (22).

6. The optical sensing head as claimed in claim 5, characterized in that the supporting element (38) which is arranged between the laser component (30) and the opposite-direction signal detector (22) is provided with a metallic or dielectric mirrored layer (44) on its surface facing the laser component.

7. The optical sensing head as claimed in claim 5, characterized in that the supporting element (38A) which is arranged between the laser component (30) and the opposite-direction signal detector (22) is provided with an absorption layer (44A) on its surface facing the laser component.

8. The optical sensing head as claimed in one of claims 5 to 7, characterized in that the supporting element which is arranged between the laser component (30) and the opposite-direction signal detector (22) is embodied as a deflection device (38B, 38C) which deflects away stray light of the laser component (30) from the opposite-direction signal detector (22).

9. The optical sensing head as claimed in claim 8, characterized in that the supporting element which is embodied as a deflection device (38B, 38C) deflects stray light in a direction essentially perpendicular to the main surface.

10. The optical sensing head as claimed in one of the preceding claims, characterized in that the at least one signal detector (20, 22; 62) is formed in the substrate (12).

11. The optical sensing head as claimed in claim 10, characterized in that the at least one signal detector (20, 22; 62) comprises an array (90; 92; 94; 96) of PIN photodiodes which are formed in the substrate (12).

12. The optical sensing head as claimed in one of the preceding claims, characterized in that a monitor detector (18; 52; 64) for checking the irradiated power of the laser component (30) is integrated on the substrate (12).

13. The optical sensing head as claimed in one of the preceding claims, characterized in that the substrate (12) is formed by a silicon substrate.

14. The optical sensing head as claimed in one of the preceding claims, characterized in that the at least one supporting element (36, 38) and/or the deflection device (36) are produced from glass and nondetachably connected to the substrate.

15. The optical sensing head as claimed in one of the preceding claims, characterized in that the main surface of the substrate (12) has an area of 10 mm^2 or less.

16. A method for fabricating an optical sensing head as claimed in one of claims 1 to 15, in which, in order to fabricate the deflection device,
- a glass wafer is sawn into individual strips,
- surfaces are ground onto the strips at a predetermined angle, in particular an angle of approximately 45°,
- the ground surfaces are coated with a highly reflective mirrored layer in order to obtain a deflection prism for the deflection of laser beams, and
- the deflection prisms are orientated and connected nondetachably to the substrate.

17. The method as claimed in claim 16, characterized in that the deflection prisms are connected to the substrate by anodic bonding.

18. The method as claimed in claim 16 or 17, characterized in that, before the glass wafer is sawn, regions on the front side of the glass wafer are metalized in order to provide soldering surfaces for connecting optical components to the substrate after the connection of the deflection prisms.

19. The method as claimed in one of claims 16 to 18, characterized in that, before the glass wafer is sawn, trenches are introduced into the rear side of the glass wafer by sandblasting.

20. The method as claimed in one of claims 16 to 19, characterized in that the supporting elements are fabricated from the glass wafer at the same time as the deflection device.

21. The method as claimed in one of claims 16 to 20, characterized in that an array of PIN photodiodes is formed in the substrate as signal detector/detectors.